

Baseflow Separation Tools; What do they really do?

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Baseflow separation plays a major role in calculation of runoff coefficients and in the component-wise calibration of hydrologic models. The tools which are used in separating baseflow are based on various assumptions which may not be fully met across various catchments. When used in the cases where the hypotheses behind their operation are not fully met, what will the tools do? This study investigated the performance of selected baseflow separation tools if some of the assumptions on which they were based are not met. Different natures of catchments were represented by models created in a flexible modelling platform, SUPERFLEX. Flow time series for the base flow component, the quick flow component and the total discharge were generated from the models at daily and hourly time step. Three baseflow separation tools, namely; the BFI tool, the SWAT baseflow separation tool and WETSPRO, were used to filter baseflow from the total discharge time series and the filtered baseflow was compared to the original baseflow from the model. The results show that the assumption of exponential recession holds true across a wide range of catchment structures. Thus, WETSPRO provides better estimates of baseflow in a wider range of catchments. It was also shown that the assumptions behind the SWAT baseflow separation tool, and hence performance, heavily depend on the time step of the discharge time series. The BFI was found to mostly overestimate the baseflow during wet periods when used in most catchments although modifying the block size improved its performance.

Keywords: SUPERFLEX, SWAT, WETSPRO, BFI.